WORK PLAN

DEVELOPMENT OF A GEOGRAPHIC INFORMATION SYSTEM AS A MANAGEMENT TOOL TO REDUCE BYCATCH OF SEA TURTLES IN U.S. ATLANTIC OCEAN AND GULF OF MEXICO FISHERIES

A Partnership Project Between NOAA's

National Marine Fisheries Service & National Ocean Service

Office of Protected Resources & the National Centers for Coastal Ocean Science

Prepared by the

Biogeography Team

Center for Coastal Monitoring & Assessment

National Ocean Service / National Centers for Coastal Ocean Science

National Oceanic & Atmospheric Administration

Updated: 5/05

DEVELOPMENT OF A GEOGRAPHIC INFORMATION SYSTEM (GIS) AS A MANAGEMENT TOOL TO REDUCE BYCATCH OF SEA TURTLES IN U.S. ATLANTIC OCEAN AND GULF OF MEXICO FISHERIES

GOAL

The National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service's National Centers for Coastal Ocean Science (NCCOS) has partnered with the NOAA National Marine Fisheries Service (NMFS) Office of Protected Resources to develop a dynamic geographic information system (GIS) for managing and analyzing interactions between the United States (U.S.) Atlantic and Gulf of Mexico fisheries and sea turtles. The GIS supports the NMFS strategy for sea turtle conservation and recovery in relation to Atlantic Ocean and Gulf of Mexico fisheries (the "Strategy") to fully characterize domestic fisheries, evaluate sea turtle bycatch across gear types, develop and implement measures to reduce bycatch, authorize fishery takes consistent with Endangered Species Act (ESA) mandates, and conserve and recover sea turtles (Figure 1). Data incorporated into the GIS include commercial fishing activity, existing federal regulations related to sea turtles, surveys of sea turtle distribution, and observed bycatch of sea turtles across the Atlantic and Gulf of Mexico. Products and activities of the GIS project include: 1) development of GIS layers necessary to implement the Strategy, 2) support NMFS with data quality assurance and data quality control, 3) create visual products and analyses needed to implement the Strategy, 4) provide consultative support to the Strategy to expand GIS capabilities to meet broader agency needs, and 5) train NMFS' Strategy team members to effectively manipulate data layers created and utilize mapping capabilities and analyses tools specifically created for the GIS.

OBJECTIVES

1. Development of a comprehensive GIS in cooperation with NMFS that incorporates:
   a. Sea turtle distribution
   b. Commercial fishing activity
   c. Observed takes (bycatch) of sea turtles
   d. Federal and state regulations relevant to sea turtles
   e. Oceanographic conditions relevant to sea turtle distribution
2. Support NMFS with data quality assurance and quality control of sea turtle, fisheries, oceanographic, and regulatory data
3. Support NMFS with processing and development of GIS data layers to be used to create visual products, tools, and analyses needed to implement the Strategy
4. Provide NMFS with consultative support to expand GIS capabilities to meet broader agency needs
5. Train NMFS' Strategy team members to effectively manipulate data layers and mapping capabilities created for the GIS in ArcMap

PROJECT BACKGROUND

All species of sea turtles inhabiting the Atlantic Ocean and Gulf of Mexico are listed as either endangered or threatened under the ESA. Five species of sea turtles are commonly found in U.S. Atlantic and Gulf of Mexico waters. None of the species have yet met the recovery goals outlined in their respective recovery plans. Within this region, the leatherback, loggerhead, and Kemp's ridley are the most widely distributed, while the green turtle and hawksbill are found more commonly south of Virginia. Trends in populations are difficult to determine but among the five species, only the Kemp's ridley has shown a long-term, strongly increasing trend in the number of nesting females (the most common measure of population status). Loggerheads nest predominately from North Carolina through the panhandle of Florida and these beaches comprise the second largest nesting assemblage in the world. Along the mainland U.S., the leatherback and green turtle nest almost exclusively in Florida. U.S. inshore and offshore waters from Maine through Texas provide critically important habitat for feeding, migration, courtship, and mating.

Incidental capture in fisheries is a major limiting factor in the recovery of sea turtles in these areas.

NMFS is responsible for protecting sea turtles in the marine environment and has implemented conservation and monitoring programs, regulations, and other actions under the ESA to recover these species. To further help meet ESA recovery goals for sea turtles, NMFS is implementing the strategy for sea turtle conservation and recovery in relation to Atlantic Ocean and Gulf of Mexico fisheries ("Strategy"; Figure 1). The Strategy, finalized in a decision memorandum in June 2001, is a strategic plan to address the incidental capture of sea turtles in federal and state fisheries through a comprehensive, integrated, and consistent gear-based approach. The Strategy is a new approach to reducing incidental capture of sea turtles in U.S. commercial and recreational fisheries that will rely heavily upon involvement of stakeholders (e.g., fishing industry, non-government organizations, and the interested public). This strategy evolved out of the need to address sea turtle bycatch reduction in fisheries of the Atlantic and Gulf of Mexico in a more comprehensive way. A strategic approach evaluating fishery impacts by gear types across state, federal, and regional boundaries will increase management effectiveness. Rather than addressing turtle bycatch issues fishery by fishery, or state by state, the Strategy will focus on fishing gear types known to take sea turtles across their range in the Atlantic and Gulf of Mexico. Ultimately this approach should be both effective and inclusive for the challenge of recovering threatened and endangered sea turtles in the Atlantic and Gulf with U.S. fishery constituents. The major priorities of the Strategy include: a) continue and improve stock assessments for each stock/species of sea turtle found within the U.S. Exclusive Economic Zone (EEZ), b) improve and refine estimation techniques for the takes of sea turtles to ensure that the criteria for recovery are being met are consistent with ESA mandates, c) continue and improve the estimation or categorization of sea turtle bycatch by gear type and fishery, d) evaluate the significance of bycatch by gear type, e) convene specialist groups to prepare plans for reduction of takes for gear types with significant levels of sea turtles take, and f) promulgate ESA and Magnuson-Stevens Act (MSA) regulations implementing plans developed for se turtle take reduction by gear type. Sea turtle conservation measures will be developed using all elements of the Strategy - information gathering, research and analysis, and stakeholder involvement.

The professional development of a dynamic GIS for sea turtles to facilitate the implementation of the Strategy is a key baseline need. The development of such a GIS would also assist NMFS in meeting other ESA and legislative responsibilities that require everything from simple maps to in-depth geographic/oceanographic analyses. While there are several efforts that have been undertaken to compile sea turtle datasets into a GIS environment there has been no comprehensive NMFS sea turtle program-wide approach. The development of a fully integrated GIS for turtles would be cross-regional and would serve the national program. NCCOS' Biogeography Team has been identified as the most appropriate group within NOAA to develop these capacities for NMFS. The Biogeography Team has extensive GIS and database experience to ensure that the products developed will meet the needs of the Strategy and NMFS. Partnering with NCCOS' Biogeography Team will facilitate working with both regions and centers as well as coordinating with NMFS' Office of Protected Resources-based team leader for the Strategy.

PROJECT OVERVIEW

NCCOS' Biogeography Team, in consultation with the NMFS' Strategy team, will develop a GIS that characterizes sea turtle interactions with commercial fisheries in the U.S. Atlantic and Gulf of Mexico waters, including inshore waters, state regulated waters, and federally regulated waters (out to the EEZ, Figure 1). NCCOS' Biogeography Team will examine the relationship between sea turtles and commercial fisheries by incorporating existing data on oceanographic conditions, sea turtle distribution, commercial fishing activity, known interactions between sea turtles, and commercial fisheries (observed bycatch), and marine managed areas within a comprehensive GIS. Requested GIS data products, tools, analyses, input, and guidance for the Strategy will be provided to expand GIS capabilities to meet broader agency. In addition, NCCOS' Biogeography Team will provide training sessions on the sea turtle GIS. NMFS Strategy team members will be able to effectively manipulate data layers and utilize mapping capabilities and analyses tools created specifically for the GIS to conserve and recover sea turtles.

This work will complement the NMFS' Strategy that involves the characterization of Atlantic and Gulf of Mexico state waters, estimation of bycatch estimation, gear research, compilation of

Endangered Species Act, Marine Mammal Protection Act, and Magnuson-Stevens Act regulations, and National Environmental Policy Act (NEPA) scoping (see Appendix A).

PROJECT TASKS

The major tasks of the NCCOS' Biogeography Team are outlined below. The principal task (Task 1) involves creating data layers that are relevant to the conservation and recovery of sea turtles to be incorporated into the final GIS. Supporting tasks (Tasks 2-5) will be ongoing throughout the course of the project and will be completed after the GIS has been fully developed.

Task 1. Development of a comprehensive GIS for the Strategy

(Estimated Completion Date of Final Project: 12/05)

NCCOS' Biogeography Team will compile oceanographic data relevant to sea turtle distribution (i.e., sea surface temperature, bathymetry, and chlorophyll concentration) and all data transferred from NMFS (i.e., sea turtle distribution, commercial fishing activity, observed takes [bycatch] of sea turtles, and state and federal regulations relevant to sea turtles) into a comprehensive GIS. The task of developing a comprehensive GIS to support conservation and recovery of sea turtles has been divided into the following areas:

A. Compile oceanographic layers relevant to sea turtle distribution

(Estimated Completion Date: 10/04)

NCCOS' Biogeography Team will compile layers characterizing oceanographic conditions relevant to sea turtle distribution (i.e., sea surface temperature, chlorophyll concentration, and bathymetry).

B. Develop layers of marine managed areas

(Estimated Completion Date: 12/04)

NMFS will compile regulations that operate under the ESA, MMPA, and MSA mandates relevant to sea turtles and NCCOS' Biogeography Team will use these regulations to develop layers that show the extent of the marine managed areas in the U.S. Atlantic and Gulf of Mexico.

C. Develop layers showing sea turtle distribution

(Estimated Completion Date: 4/05)

NMFS will supply data on sea turtle distribution and occurrence from existing surveys and NCCOS' Biogeography Team will develop layers that will display sea turtle distribution and survey effort appropriate for the Strategy's needs.

D. Develop layers showing commercial fishing activity

(Estimated Completion Date: 6/05)

NCCOS' Biogeography Team will develop appropriate layers showing commercial fishing activity and effort relevant to the conservation and recovery of sea turtles, as data is supplied by NMFS.

E. Develop layers showing observed takes (bycatch) of sea turtles

(Estimated Completion Date: 8/05)

NMFS will supply data on fisheries' observer data and NCCOS' Biogeography Team will develop appropriate layers that will display observed takes (bycatch) of sea turtles and observation efforts.

Task 2. Support NMFS with data quality assurance and quality control

(Estimated Completion Date: 12/05)

All data received and compiled will be reviewed for quality assurance and quality control before incorporation. In addition, appropriate metadata for each data set will be created and provided.

Task 3. Create visual products, tools, and analyses needed to implement the Strategy

(Estimated Completion Date: 12/05)

NCCOS' Biogeography Team will support NMFS with processing and development of GIS data layers to create visual products as requested to guide the Strategy to meet broader agency needs. Examples of support include development of a website as tool to communicate ideas, promote dialogue, and measure progress.

Task 4. Provide NMFS with consultative support for implementation of Strategy

(Estimated Completion Date: 12/05)

NCCOS' Biogeography Team will provide input and guidance to the Strategy to expand GIS capabilities to meet broader agency needs. Examples of support include GIS analyses of sea turtle, fisheries, regulatory, and oceanographic data and guidance for maintaining a dynamic GIS such that continuous change, activity, or progress of sea turtle conservation and recovery would be characterized within the GIS.

Task 5. Train NMFS' Strategy team members on the dynamic GIS

(Estimated Completion Date: 12/05)

NCCOS' Biogeography Team will train NMFS' Strategy team members to effectively manipulate data layers and utilize mapping capabilities and analyses tools specifically created in the GIS to support conservation and recovery of turtles.

PROJECT PERIOD: September 2003 – December 2005

NCCOS PROJECT DELIVERABLES:

1. Progress Reports: 4/1/05; 7/1/05; 10/1/05
2. Final Project Report (and completed GIS): 12/31/05

STRATEGY TEAM MEMBERS

NMFS' Office of Protected Resources is leading the collaborative effort. Other project members include staff from the NCCOS' Biogeography Team, NOAA Office of Protected Resources, Northeast Fisheries Science Center, Northeast Regional Office, Southeast Fisheries Science Center, and Atlantic States Marine Fisheries Commission.

STRATEGY TEAM CONTACT INFORMATION

Dobrzynski, Tanya J

Team Coordination

NMFS HQTR Route: F/PR2 Building: SSMC3, Rm. 13752

1315 East West Hwy

Silver Spring, MD 20910-3282

(301) 713-2322 x160

Tanya.Dobrzynski@noaa.gov

Haas, Heather L

Research Fishery Biologist/Sea Turtle Program

NMFS EASC Route: F/NEC32

166 Water St.

Woods Hole, MA 02543

(508) 495-2315

Heather.Haas@noaa.gov

Keane, Ellen P

Northeast Federal Fisheries Characterization, Section 7, NEPA, and GIS

NMFS EASC Route: F/NER3

1 Blackburn Dr.

Gloucester, MA 01930-2298

(978) 281-9328 x6526

Ellen.Keane@noaa.gov

Klemm, Dennis L

Southeast Federal Fisheries Characterization, Section 7, NEPA

NMFS CASC Route: F/SER3 Koger Building, Rm 9721

Executive Center Dr. N

St. Petersburg, FL 33702-2439

(727) 570-5777

Dennis.Klemm@noaa.gov

Milliken, Henry

Gear Research

NMFS EASC Route: F/NEC32, Rm 305

166 Water St.

Woods Hole, MA 02543

(508) 495-2066

Henry.Milliken@noaa.gov

Murray, Kimberly T

Northeast Bycatch Analysis

NMFS EASC Route: F/NEC32

166 Water St.

Woods Hole, MA 02543

(508) 495-2197

Kimberly.Murray@noaa.gov

Richards, Paul M

Southeast Bycatch Analysis

NMFS CASC Route: F/SEC2 Building: 2, Rm. 203A

75 Virginia Beach Dr.

Miami, FL 33149-1003

(305) 361-4591

Paul.Richards@noaa.gov

PARTNERING PARTICIPANTS CONTACT INFORMATION

Buja, Ken

National Centers of Coastal Ocean Science - Biogeography Team

1305 East West Highway, N/SCI1, 9th Floor

Silver Spring, MD 20910

(301) 713-3028 x140

Ken.Buja@noaa.gov

Christensen, John

National Centers of Coastal Ocean Science - Biogeography Team

1305 East West Highway, N/SCI1, 9th Floor

Silver Spring, MD 20910

(301) 713-3028 x135

John.Christensen@noaa.gov

Conant, Therese

National Marine Fisheries Service - Office of Protected Resources

NMFS HQTR Route: F/PR3 Building: SSMC3

Building: SSMC3

1315 East West Hwy

Silver Spring, MD 20910-3282

(301) 713-1401 x126

Therese.Conant@noaa.gov

Coyne, Michael

Duke University

A321 LSRC, Box 90328

Nicholas School of the Environment and Earth Science

(919) 613-8119

mcoyne@duke.edu

Fullenkamp, Lindsay
Atlantic States Marine Fisheries Commission
1444 Eye St. NW, 6th Floor
Washington, DC 20005
(202) 289-6400
lfullenkamp@asmfc.org

Griffin, Elizabeth
Atlantic States Marine Fisheries Commission
1444 Eye St. NW, 6th Floor
Washington, DC 20005
(202) 289-6400
egriffin@asmfc.org

Monaco, Mark
National Centers of Coastal Ocean Science - Biogeography Team
1305 East West Highway, N/SCI1, 9th Floor
Silver Spring, MD 20910
(301) 713-3028 x160
Mark.Monaco@noaa.gov

Moy, Connie Y
National Centers of Coastal Ocean Science - Biogeography Team
1305 East West Highway, N/SCI1, 9th Floor
Silver Spring, MD 20910
(301) 713-3028 x227
Connie.Moy@noaa.gov

Schroeder, Barbara

National Marine Fisheries Service - Office of Protected Resources

NMFS HQTR Route: F/PR3 Building: SSMC3

1315 East West Hwy

Silver Spring, MD 20910-3282

(301) 713-1401 x147

Barbara.Schroeder@noaa.gov

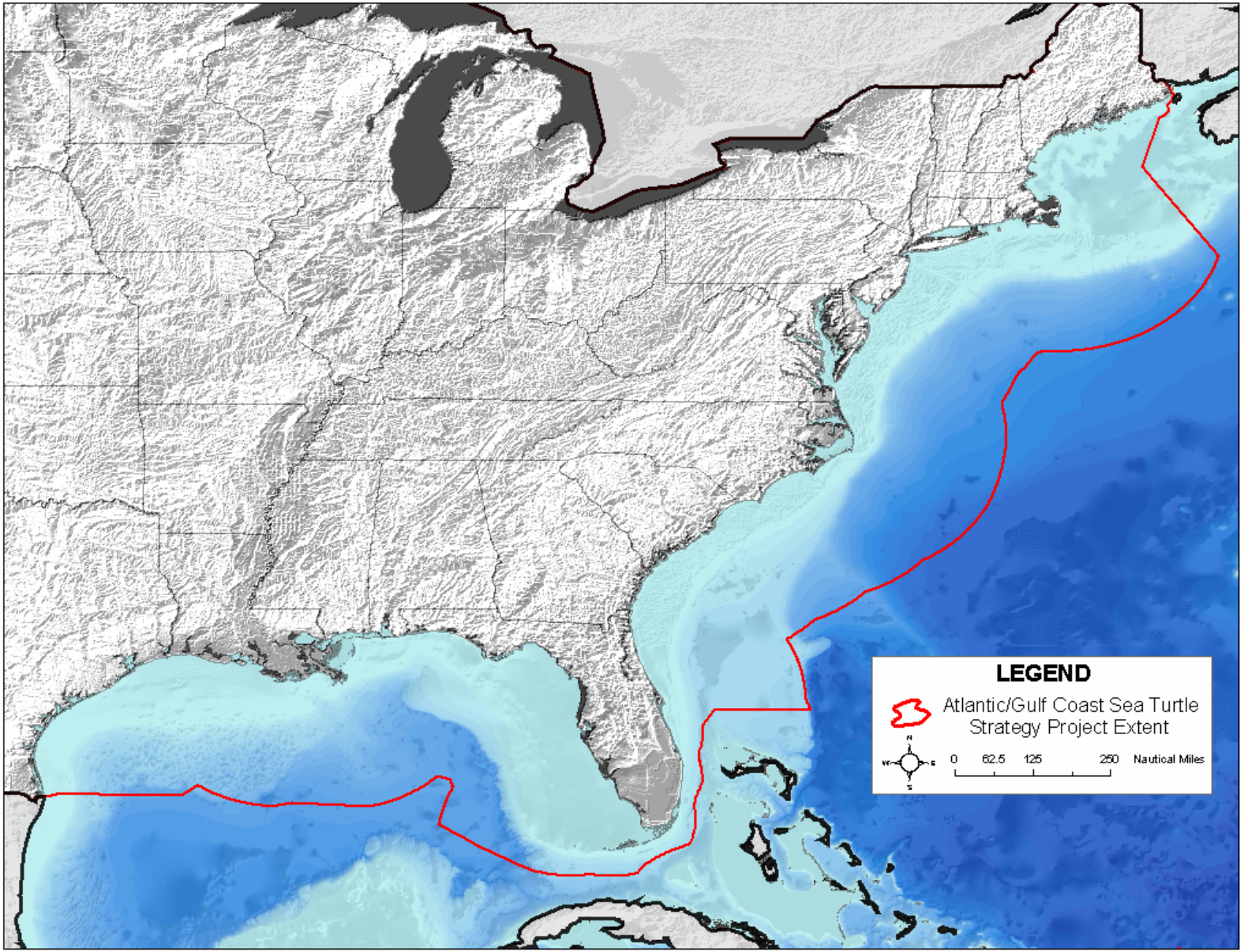

Figure 1. National Marine Fisheries Service's Atlantic/Gulf coast sea turtle strategy project extent. Area includes inshore waters, state regulated waters, and federally regulated waters (Exclusive Economic Zone [EEZ]).

APPENDIX A. NMFS' Strategy team's project tasks and estimated completion dates

Task 1. Fisheries Characterization of Atlantic and Gulf State Waters
(Estimated Completion Date: Gulf final report – 6/05; Atlantic Final report - 12/05)
NMFS will contract to the Atlantic States Marine Fisheries Commission (ASFMC) and to individual Gulf states to compile a comprehensive report that provides detailed information regarding state managed fisheries along the Atlantic coast. The report will be organized into state chapters within which fisheries will be fully characterized and organized by gear type. The state and federal fisheries characterizations will be presented in a binder which can ultimately serve as the introduction to the Environmental Impact Statement (EIS). The ASFMC structure should mirror the federal structure and both will cover the period from 1998-2002. Fisheries Protected Resources and Fisheries regional staff will work with the ASFMC to finalize a standardized framework and list of gear and sub-gear categories.

Task 2. Bycatch Estimation
(Estimated Completion Date: Final report – 12/04; Pilot program final report – 9/05)
NMFS will compile a comprehensive report that provides detailed information regarding all observed sea turtle interactions and assess the incidental take levels and management recommendations. This includes information on geographical areas of fisheries and fisheries observer coverage, monitoring pound nets, purse seines, and gillnets in the Chesapeake Bay area during spring and summer of 2004 to determine whether interactions with sea turtles are occurring, and a pilot program to monitor bycatch of sea turtles in skimmer trawls. The final report will be cross referenced with the fisheries characterization and will help identify the important gaps in bycatch estimation and to develop a plan to direct observer coverage for sea turtles where it is needed. The plan will then be implemented in two phases: 1) deploy observers; and 2) estimate bycatch.

Task 3. Gear Research

(Estimated Completion Date: Unknown)

NMFS will compile a comprehensive report that provides detailed information regarding all gear research involved for sea turtle interactions and determine effectiveness of modified fishing gear and to develop management recommendations to implement modifications, if successful in reducing sea turtle bycatch. The development of a research plan for gear and fisheries practices will involve the NOAA science centers with input from the Pascagoula Harvesting Systems Branch. This includes experimental testing of a modified pound net leader to determine if sea turtle bycatch can be reduced or eliminated.

Task 4. Endangered Species Act, Marine Mammal Protection Act, and Magnuson-Stevens Act Regulations

(Estimated Completion Date: Unknown)

NMFS will compile a comprehensive matrix that provides detailed information regarding all existing and anticipated ESA, Marine Mammal Protection Act (MMPA), and MSA regulations relevant to sea turtles. This matrix will be appended to the fisheries characterization report and used in the GIS database. Since there are new regulations anticipated, the matrix will be updated as needed.

Task 5. National Environmental Policy Act (NEPA) Scoping Plan

(Estimated Completion Date: 5/05)

NMFS will provide a draft EIS with regionally based alternatives (and impacts) for making the Strategy work. This involves input by all stakeholders, including the Fishery Management Councils, Atlantic and Gulf States Marine Fisheries Commissions, State Fisheries and Wildlife Agencies, and other interested members of the public.